

Name \_\_\_\_\_



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***New York State  
Testing Program***

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**Mathematics Test**

Common Core Practice Test

8<sup>th</sup> Grade

## Grade 8 Mathematics Reference Sheet

### CONVERSIONS

1 inch = 2.54 centimeters

1 meter = 39.37 inches

1 mile = 5,280 feet

1 mile = 1,760 yards

1 mile = 1.609 kilometers

1 kilometer = 0.62 mile

1 pound = 16 ounces

1 pound = 0.454 kilogram

1 kilogram = 2.2 pounds

1 ton = 2,000 pounds

1 cup = 8 fluid ounces

1 pint = 2 cups

1 quart = 2 pints

1 gallon = 4 quarts

1 gallon = 3.785 liters

1 liter = 0.264 gallon

1 liter = 1,000 cubic centimeters

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### FORMULAS

**Triangle**

$$A = \frac{1}{2}bh$$

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**Parallelogram**

$$A = bh$$

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**Circle**

$$A = \pi r^2$$

---

**Circle**

$$C = \pi d \text{ or } C = 2\pi r$$

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**General Prisms**

$$V = Bh$$

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**Cylinder**

$$V = \pi r^2 h$$

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**Sphere**

$$V = \frac{4}{3}\pi r^3$$

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**Cone**

$$V = \frac{1}{3}\pi r^2 h$$

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**Pythagorean Theorem**

$$a^2 + b^2 = c^2$$

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Answer questions 1 through 34. You may NOT use a calculator.

1 How is  $6.35 \times 10^{11}$  written in standard form?

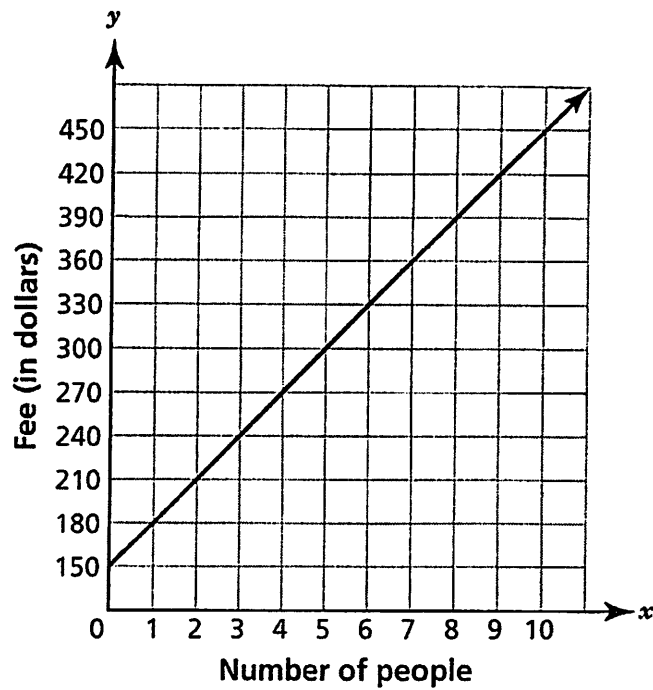
- A 6,350,000,000
- B 63,500,000,000
- C 635,000,000,000
- D 6,350,000,000,000

2 The moon travels about  $1.42 \times 10^7$  meters of its orbit in one twenty-four hour period. Which of the following is the *most reasonable* estimate for the distance the moon travels around the Earth in 27 days?

- A  $4.5 \times 10^7$  meters
- B  $2.8 \times 10^8$  meters
- C  $3.8 \times 10^8$  meters
- D  $2.8 \times 10^7$  meters

3

The graph below models the cost of holding a banquet at the Tea Room restaurant.



What is the initial fee and cost per person to hold a banquet at the Tea Room?

- A fee: \$150, cost per person: \$30
- B fee: \$30, cost per person: \$150
- C fee: \$0, cost per person: \$30
- D fee: \$150, cost per person: \$0

4

Which set of side lengths can form a triangle?

- A 6 cm, 8 cm, and 16 cm
- B 6 cm, 8 cm, and 10 cm
- C 6 cm, 7 cm, and 14 cm
- D 6 cm, 7 cm, and 20 cm

**Go On**

**5**

Which step would *not* be a possible first step for solving the following equation algebraically?

$$\frac{3}{4}(8q - 12) + 3\frac{5}{6} = 6 + \frac{1}{4}q$$

- A** multiply every term in the equation by 12
- B** subtract  $3\frac{5}{6}$  from 6
- C** multiply  $-12$  by  $\frac{3}{4}$
- D** subtract  $\frac{1}{4}q$  from  $8q$

**6**

Four teams, *A*, *B*, *C*, and *D*, are participating in a regional math quiz. They were asked to find the equation of a line that passes through the points  $(5, -12)$  and  $(15, -8)$ . The table below shows their responses.

Team	Equation
<i>A</i>	$y = \frac{2}{5}x$
<i>B</i>	$y = \frac{2}{5}x - 2$
<i>C</i>	$y = \frac{2}{5}x - 14$
<i>D</i>	$y = \frac{2}{5}x + 2$

Which team answered correctly?

- A** Team *A*
- B** Team *B*
- C** Team *C*
- D** Team *D*

7 Which ordered pairs prevent the following set from being a function?

$\{(1, 3), (2, 4), (3, 4), (3, 6), (5, 10), (6, 3)\}$

A  $(3, 4), (2, 4)$

B  $(3, 4), (3, 6)$

C  $(1, 3), (3, 4)$

D  $(3, 6), (6, 3)$

8 Due to plate tectonics, the summit of Mount Everest moves about  $4.5 \times 10^{-3}$  meters northeastward in one year. How many millimeters did the summit of Mount Everest move in 11 years? Express your answer in scientific notation.

A  $4.5 \times 10^{-2}$  millimeters

B  $4.95 \times 10^{-2}$  millimeters

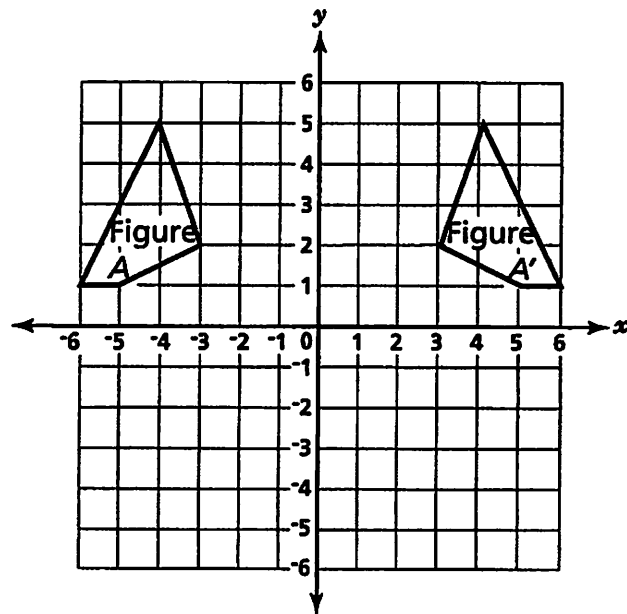
C  $4.95 \times 10$  millimeters

D  $8.55 \times 10^2$  millimeters

**Go On**

**9**

Figure A and its image after a transformation, Figure A', are shown on the coordinate plane below.



How was Figure A transformed to create Figure A'?

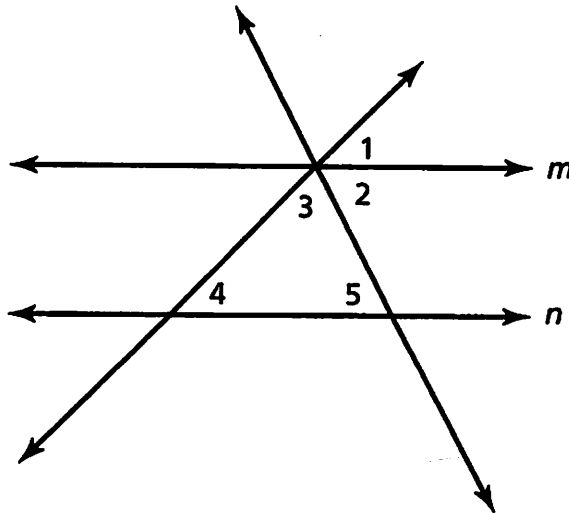
- A reflected across the  $x$ -axis
- B reflected across the  $y$ -axis
- C translated 9 units to the right
- D rotated  $90^\circ$  clockwise around the origin

**10**

A plumber charges a base fee for all service appointments. If a repair is needed, he adds a charge for each hour of labor. If the total cost,  $y$ , in dollars, of the plumber's  $x$ -hour repair visit is modeled by the equation  $y = 25x + 30$ , what could the  $y$ -intercept represent?

- A a base fee of \$0 for service appointments
- B a base fee of \$25 for service appointments
- C a base fee of \$30 for service appointments
- D a base fee of \$55 for service appointments

- 11** In the figure below, lines  $m$  and  $n$  are parallel,  $m\angle 2 = 62^\circ$ , and  $m\angle 3 = 73^\circ$ .



Which reasoning proves  $m\angle 4 = 45^\circ$ ?

- A** Since  $\angle 2$  and  $\angle 5$  are alternate interior angles,  $m\angle 5$  is also  $62^\circ$ . The sum of the measures of  $\angle 3$ ,  $\angle 4$ , and  $\angle 5$  equals  $180^\circ$ .  $m\angle 2 + m\angle 5 = 124^\circ$ . Therefore,  $m\angle 4 = 56^\circ$ .
- B** Since  $\angle 2$  and  $\angle 5$  are corresponding angles,  $m\angle 5$  is also  $62^\circ$ . The sum of the measures of  $\angle 3$ ,  $\angle 4$ , and  $\angle 5$  equals  $180^\circ$ .  $m\angle 3 + m\angle 5 = 135^\circ$ . Therefore,  $m\angle 4 = 45^\circ$ .
- C** Since  $\angle 1$  and  $\angle 5$  are alternate interior angles,  $m\angle 5$  is also  $62^\circ$ . The sum of the measures of  $\angle 3$ ,  $\angle 4$ , and  $\angle 5$  equals  $180^\circ$ .  $m\angle 3 + m\angle 5 = 135^\circ$ . Therefore,  $m\angle 4 = 45^\circ$ .
- D** Since  $\angle 2$  and  $\angle 5$  are alternate interior angles,  $m\angle 5$  is also  $62^\circ$ . The sum of the measures of  $\angle 3$ ,  $\angle 4$ , and  $\angle 5$  equals  $180^\circ$ .  $m\angle 3 + m\angle 5 = 135^\circ$ . Therefore  $m\angle 4 = 45^\circ$ .

- 12** Noralie is making a necklace using a total of 48 beads. All of the beads will be either blue or yellow. She plans to use  $\frac{1}{3}$  as many yellow beads as blue beads. How many of each color bead will she use?

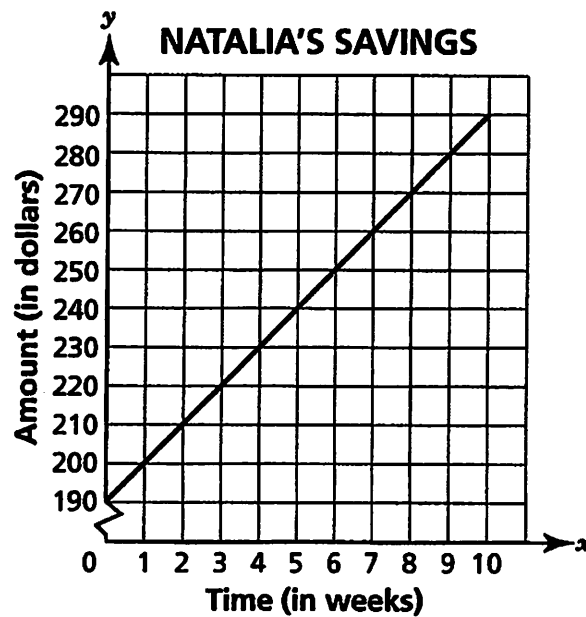
- A** 16 yellow and 32 blue
- B** 32 yellow and 16 blue
- C** 12 yellow and 36 blue
- D** 36 yellow and 12 blue

**Go On**



13

At the start of a month, Sasha and Natalia each have a certain amount of money. Sasha has \$400 and withdraws \$20 each week. The graph below shows the amount of money in Natalia's account each week.

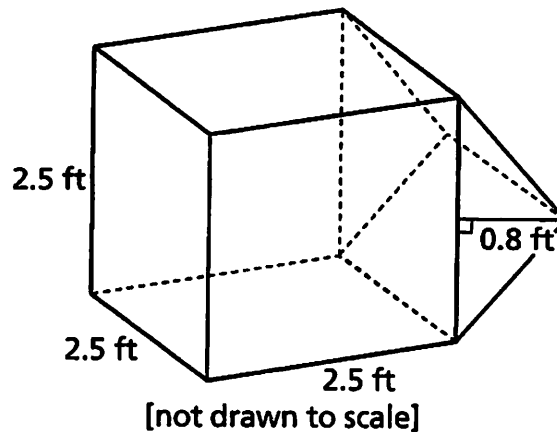


Whose monthly activity has a negative rate of change?

- A Sasha, because she is withdrawing money every week.
- B Sasha, because she has more money at the start of the month.
- C Natalia, because she is adding money each month.
- D Natalia, because she has less money at the start of the month.

**14**

A container used for shipping gift baskets is shown below.



What is the volume of the shipping container?

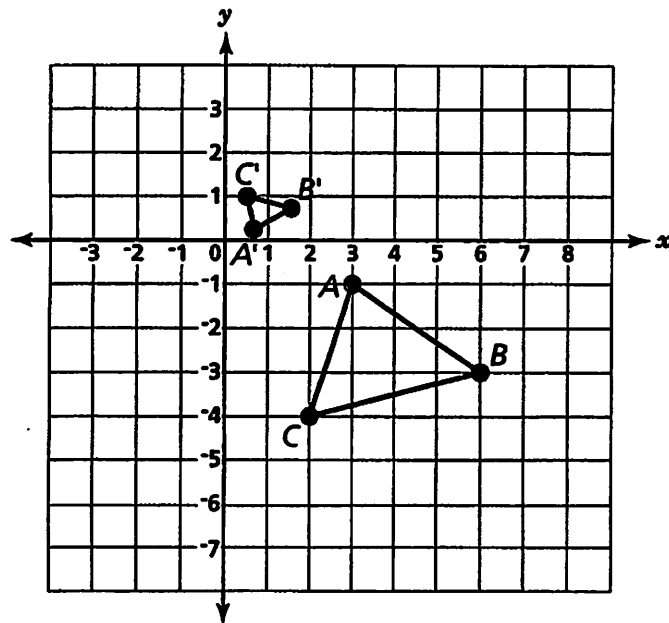
- A 12.5 cubic feet
- B 15.625 cubic feet
- C 18.125 cubic feet
- D 20.75 cubic feet

**15**

In April 2011, an online social networking site had approximately 200 million registered accounts. In August, the number of registered accounts had risen to  $3.62 \times 10^8$ . In scientific notation, how many more users were there in August than in April?

- A  $1.62 \times 10^8$
- B  $16.2 \times 10^7$
- C  $162 \times 10^6$
- D 162,000,000

**Go On**

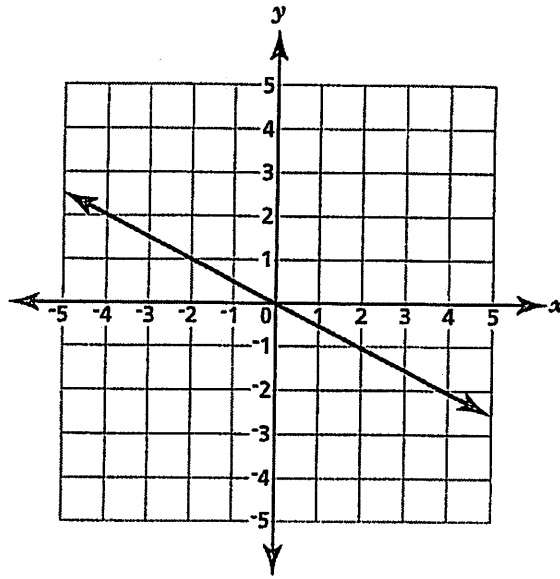
**16**Triangle  $A'B'C'$  is similar to triangle  $ABC$ .

Which sequence of transformations was used to create the similarity?

- A** Triangle  $ABC$  was reflected across the  $x$ -axis and then dilated by a scale factor of  $2$  with the origin as the center of dilation.
- B** Triangle  $ABC$  was dilated by a scale factor of  $0.25$  with the origin as the center of dilation and then reflected across the  $x$ -axis.
- C** Triangle  $ABC$  was dilated by a scale factor of  $0.25$  with the origin as the center of dilation and then reflected across the  $y$ -axis.
- D** Triangle  $ABC$  was rotated  $90^\circ$  clockwise around the origin and then reflected across the  $x$ -axis.

**17**

Use the graph below.



Which equation represents the line?

A  $y = -\frac{1}{2}x$

B  $y = -2x$

C  $y = \frac{1}{2}x$

D  $y = 2x$

**Go On**

**18**

The table below shows the hours worked last week by employees at an insurance company.

	< 30 hours	30–40 hours	> 40 hours
Managers	5	15	8
Office Staff	35	15	8

Of all the employees, what is the relative frequency of managers who work more than 40 hours per week?

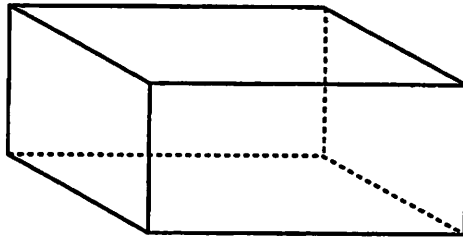
- A 8%
- B 9.3%
- C 28.8%
- D 40%

**19**

A pair of lines intersect at the point  $(-3, 4)$ . Which pair of equations represents these lines?

- A  $2x + 3y = 6$   
 $y = x - 7$
- B  $2x + 3y = 6$   
 $y = -3x + 4$
- C  $2x + 3y = 6$   
 $y = -\frac{5}{3}x - 1$
- D  $2x + 3y = 6$   
 $y = \frac{4}{3}x + 4$

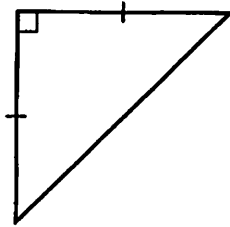
**20** A rectangular prism is shown below.



Faith drew a plane to slice the prism diagonally from the top front edge to the back bottom edge. Which figure was formed by the intersection of the prism and the plane?



**A**



**C**



**B**

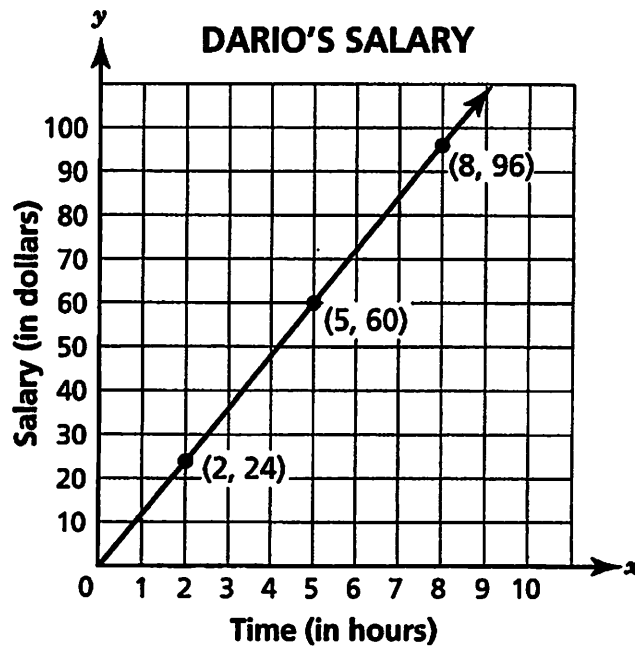


**D**

**Go On**

21

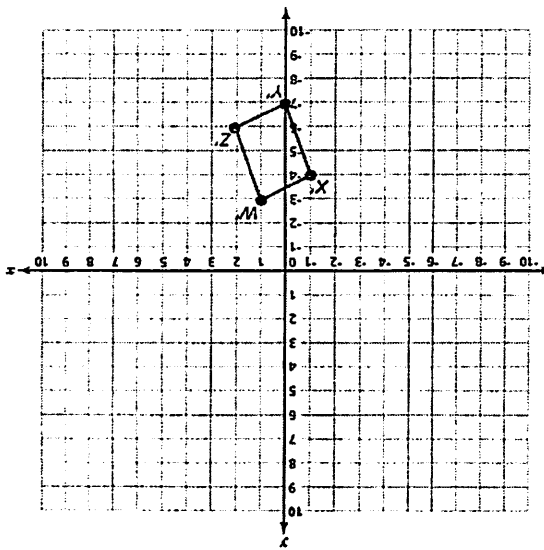
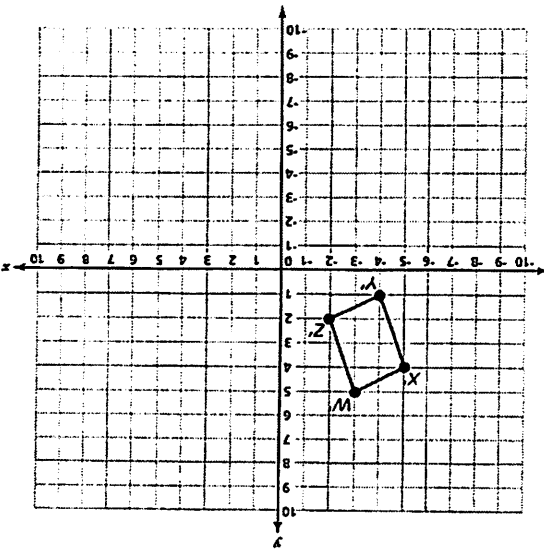
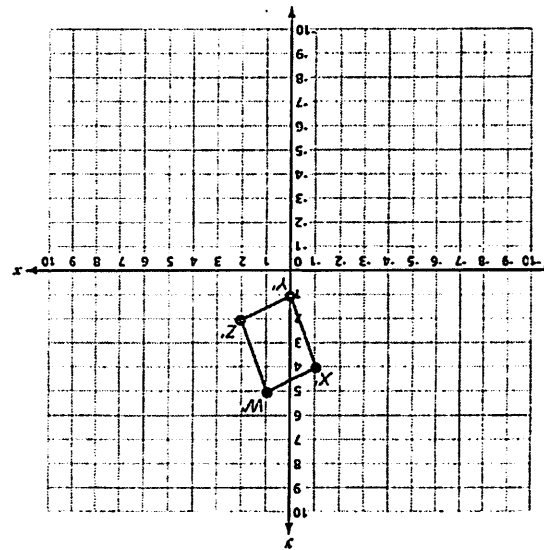
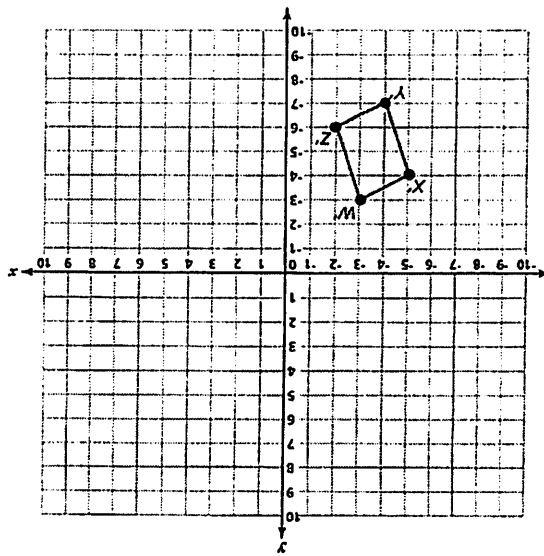
The graph below shows the number of hours Dario worked and the amount he earned.



What is Dario's hourly salary?

- A \$0.08
- B \$12
- C \$24
- D \$54

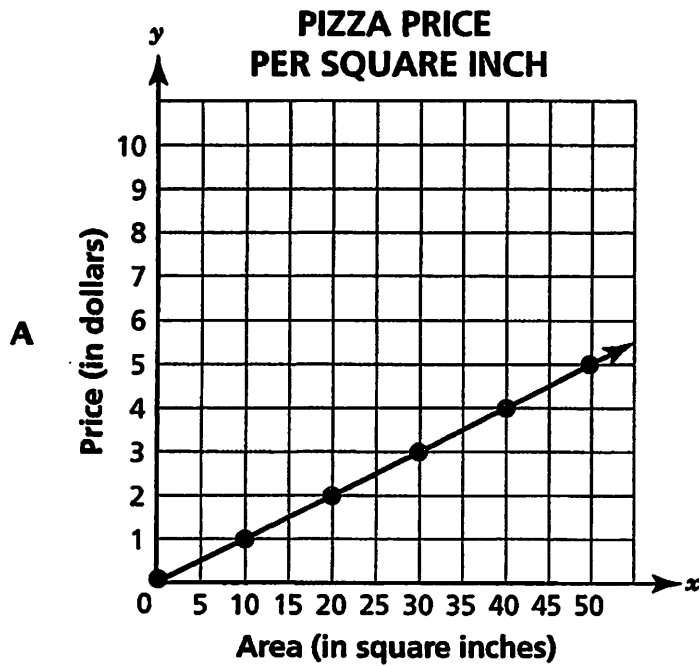
The vertices of parallelogram  $WXZY$  are  $W(-1, 1)$ ,  $X(-3, 0)$ ,  $Y(-2, -3)$ , and  $Z(0, -2)$ . Which figure is the result of parallelogram  $WXZY$  being translated 2 units to the left and 4 units down?





23

The price of a circular pizza is based on the diameter of the pizza and number of toppings. If  $P$  represents the price of the pizza, in dollars, and  $A$  represents the area of a pizza, in square inches, which function *best* represents the lowest price per square inch for a cheese pizza with no toppings?



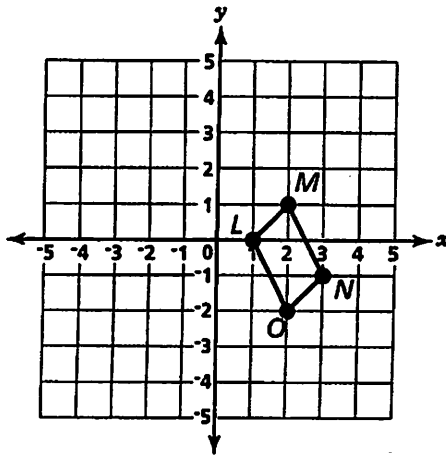
**B**  $P = \$0.16 \times A$

**C**

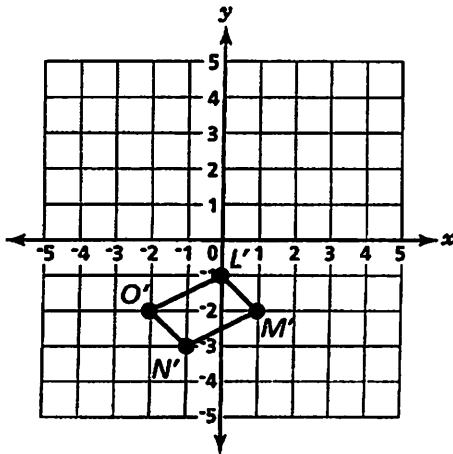
Area	Price
50 in. <sup>2</sup>	\$4.00
100 in. <sup>2</sup>	\$8.00
150 in. <sup>2</sup>	\$12.00
200 in. <sup>2</sup>	\$16.00

**D** A ten-inch pizza costs \$0.13 per square inch.

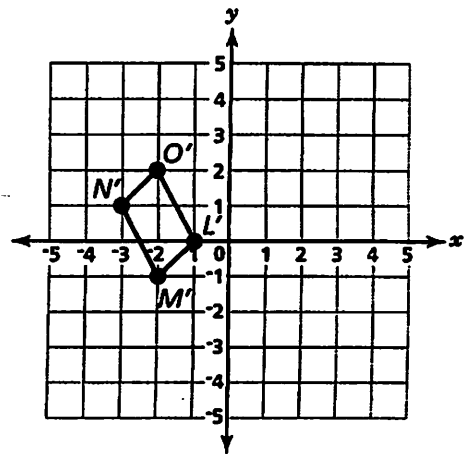
24 Parallelogram  $LMNO$  is shown below.



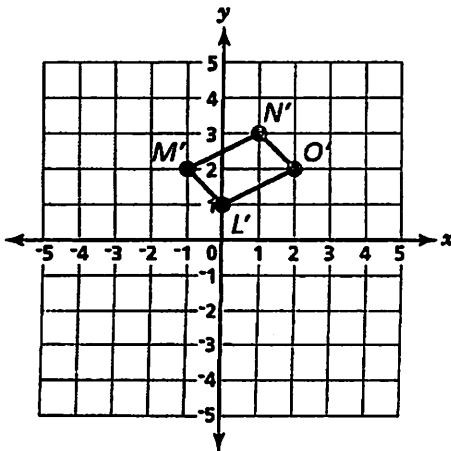
Which figure represents parallelogram  $LMNO$  rotated  $90^\circ$  counterclockwise around the origin?



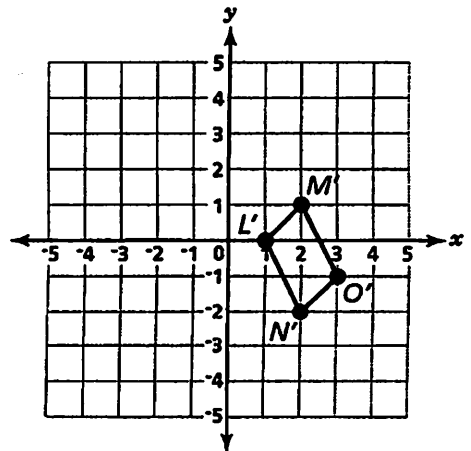
A



C



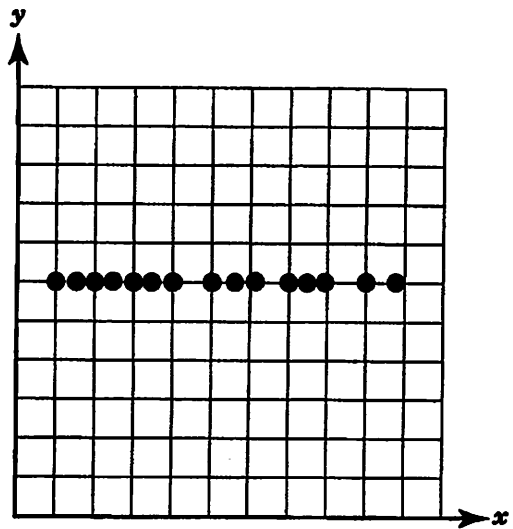
B



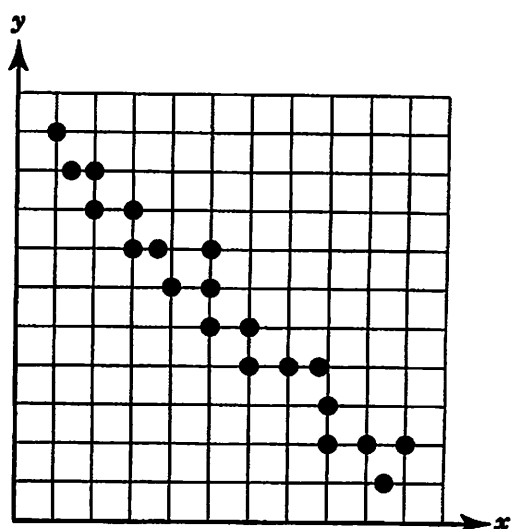
D

**Go On**

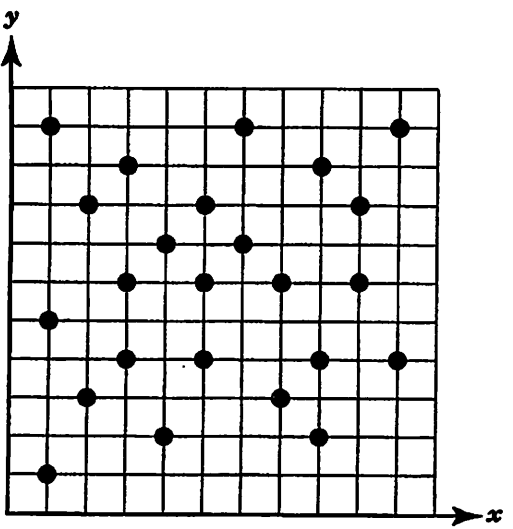
Which scatter plot has a negative correlation?



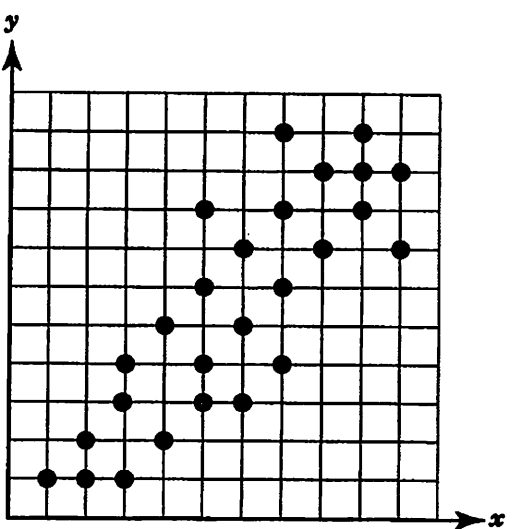
A



C



B



D

**26** Which equation represents a linear function?

**A**  $y = \frac{1}{x} + 2$

**B**  $y = x^2$

**C**  $y = 1 - \frac{4}{3}x$

**D**  $y = 10 + \frac{5}{6}x^3$

**27** How many solutions does the following equation have?

$$7x + 9 = \frac{1}{2}(8x - 12)$$

**A** no solutions

**B** infinitely many solutions

**C** one solution,  $x = -\frac{21}{5}$

**D** one solution,  $x = -5$

**28** Elvira wants to predict how much her cable television service will cost each month. She pays a fee of \$69.99 a month for service and \$4.99 for each movie she orders. She lets  $x$  represent the number of movies she watches each month and  $y$  represent the total cost for her cable service. Which equation can she use to predict how much she will pay each month?

**A**  $y = 74.98x$

**B**  $y = 4.99 + 69.99x$

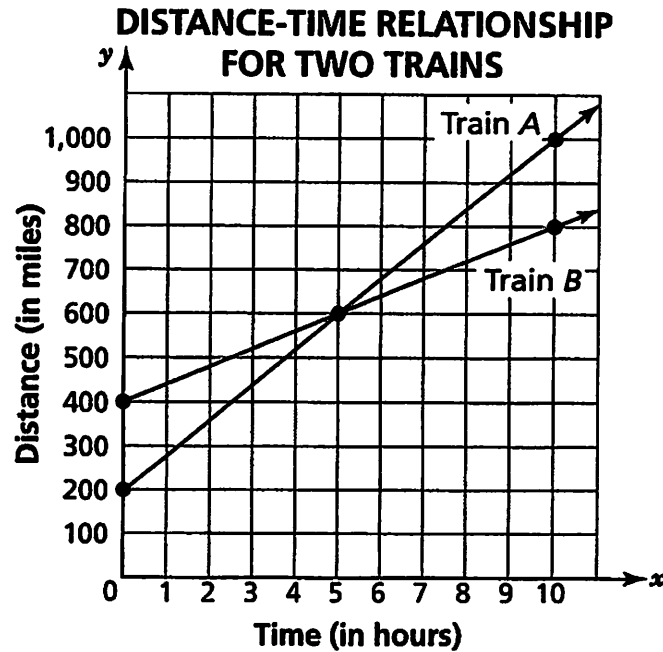
**C**  $y = 69.99 + 4.99x$

**D**  $y = 69.99 - 4.99x$

**Go On**

29

The graph below shows the positions of two trains starting from different stations at the same time. They travel at different speeds.



Which point corresponds to how far the trains have traveled and after how many hours the trains will meet?

- A (5, 600)
- B (5, 200)
- C (10, 1,000)
- D (10, 800)

30

Honshu found that the equation  $y = 0.6x + 4$  models the relationship between  $y$ , the weight, in pounds, of a puppy, and  $x$ , its age in weeks. By how much does the weight of the puppy change over time?

- A 0.6 pound every 4 weeks
- B 0.6 pound every week
- C 1 pound every 0.6 week
- D 4 pounds every week

**31** Which table shows a nonlinear association?

Week	Total Deposit
1	\$25
2	\$50
3	\$75
4	\$100
5	\$125

**A**

Month	Loan Payment
1	\$102.45
2	\$102.45
3	\$102.45
4	\$102.45
5	\$102.45

**C**

Year	Population
2001	10,000
2002	9,500
2003	9,000
2004	8,500
2005	8,000

**B**

Hours	Population
1	5
2	15
3	25
4	75
5	245

**D**

**32** Which expression is equivalent to  $\frac{2^6 \times 2^{-4}}{2^7}$ ?

**A**  $\frac{1}{32}$

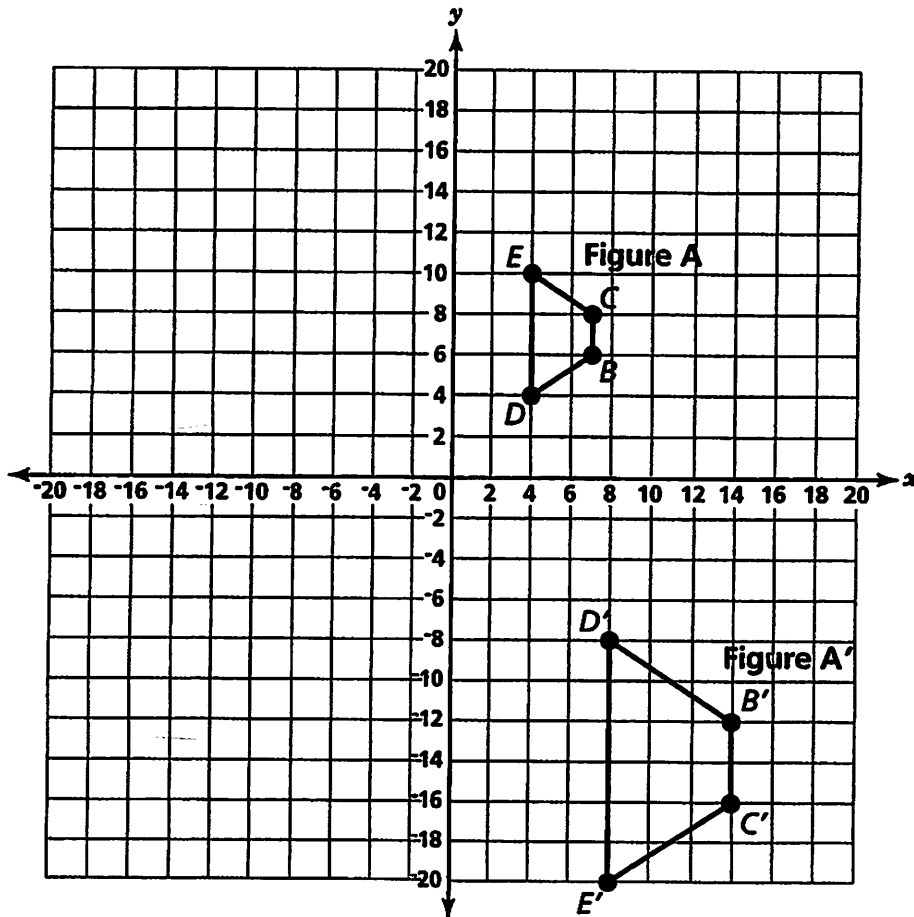
**B**  $\frac{1}{16}$

**C** 16

**D** 32

**Go On**

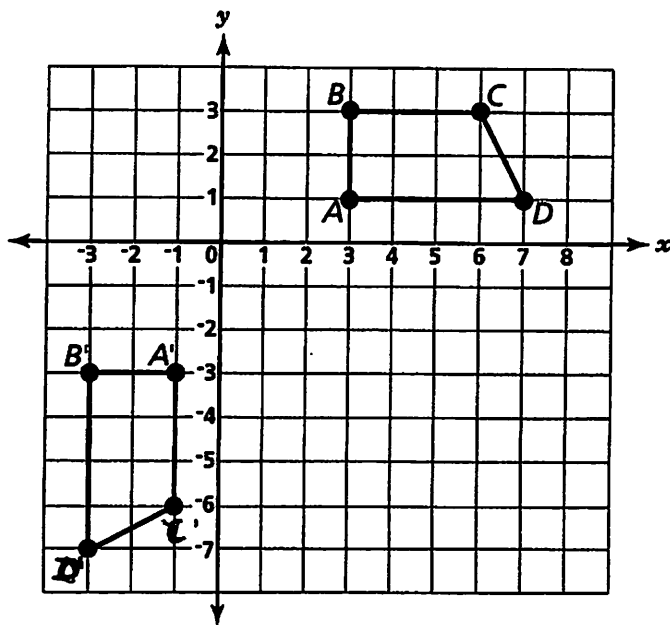
Which sequence of transformations on Figure A will generate the image Figure A', as shown on the coordinate plane below?



- A** Dilate Figure A by a scale factor of 2 and with a center of dilation at the origin, and then reflect it across the y-axis.
- B** Dilate Figure A by a scale factor of 2 and with a center of dilation at the origin, and then reflect it across the x-axis.
- C** Dilate Figure A by a scale factor of 2 and with a center of dilation at the origin, and then rotate it  $90^\circ$  clockwise around the origin.
- D** Dilate Figure A by a scale factor of 2 and with a center of dilation at the origin, and then rotate it  $180^\circ$  clockwise around the origin.

34

Quadrilateral  $ABCD$  is congruent to quadrilateral  $A'B'C'D'$ .



Which sequence of transformations was used to create quadrilateral  $A'B'C'D'$ ?

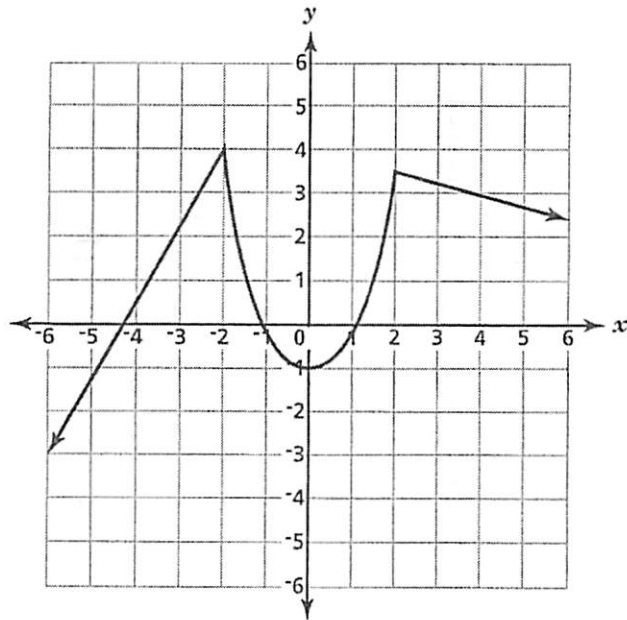
- A Quadrilateral  $ABCD$  was rotated  $90^\circ$  counterclockwise around the origin and then reflected across the  $y$ -axis.
- B Quadrilateral  $ABCD$  was rotated  $90^\circ$  clockwise around the origin and then translated 4 units to the left.
- C Quadrilateral  $ABCD$  was reflected across the  $x$ -axis and then rotated  $90^\circ$  clockwise around the origin.
- D Quadrilateral  $ABCD$  was reflected across the  $y$ -axis and then rotated  $90^\circ$  counterclockwise around the origin.

**STOP**



Answer questions 35 through 68. You may use a calculator.

- 35 On which interval is the graph below linear and increasing?



- A between  $x = -6$  and  $x = -2$
- B between  $x = -2$  and  $x = 0$
- C between  $x = 0$  and  $x = 2$
- D between  $x = 2$  and  $x = 6$

**36**

A plant cell is 0.00001267 meter wide. How is this number written in scientific notation?

- A  $0.1267 \times 10^{-4}$
- B  $1.267 \times 10^{-5}$
- C  $12.67 \times 10^{-6}$
- D  $1.267 \times 10^5$

**37**

Which table models a function?

$x$	$y$
-9	2
-9	1
-9	0
-9	-1
-9	-2

**A**

$x$	$y$
4	-2
4	2
9	-3
9	3
25	5

**C**

$x$	$y$
-4	5
-3	6
5	7
8	13
8	19

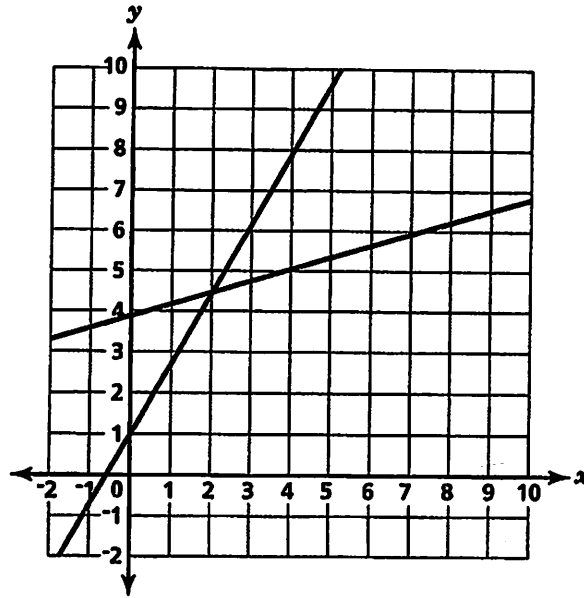
**B**

$x$	$y$
-4	4
-1	1
2	2
3	3
4	4

**D****Go On**

38

The equations  $y = 1.8x + 1.1$  and  $y = 0.25x + 3.9$  are graphed below.

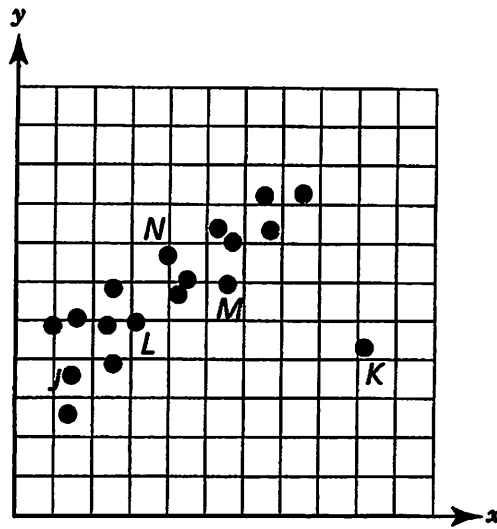


Which ordered pair comes *closest* to the solution of the system of equations?

- A (2, 4)
- B (1, 4)
- C (4, 1)
- D (4, 2)

39

Look at the scatter plot below. Liza used points  $J$  and  $K$  to draw a line of best fit for the data. Derek used the points  $J$  and  $M$  to draw a line of best fit.



Which reason *best* explains why Derek's line is a better model for the data?

- A Since point  $J$  is close to the other points, the line would also be close.
- B Since the line has a positive slope, it can be used as the line of best fit.
- C Since point  $K$  is a data point, it can be used to find the line of best fit.
- D Since point  $K$  is an outlier, the line would be below the other data points.

40

The MacVieras' kitchen is in the shape of a square. They would like to make it into a rectangular shape with a length that is 8 feet shorter than twice the width. The perimeter will be 134 feet. What are the dimensions, in feet, of the new kitchen?

- A 25 feet wide and 42 feet long
- B 35.5 feet wide and 55 feet long
- C 42 feet wide and 25 feet long
- D 47.3 feet wide and 86.6 feet long

**Go On**

**41**

Of the three linear functions represented below, which has the greatest rate of change?

Function 1:  $y = 2x + 6$

Function 2:

$x$	$y$
-1	3
1	15
2	21

Function 3: a number,  $y$ , is 2 less than half of a number  $x$ .

Which function has the greatest rate of change?

- A** Function 3 has the greatest rate of change.
- B** Function 2 has the greatest rate of change.
- C** Function 1 has the greatest rate of change.
- D** All three functions have the same rate of change.

**42**

A system of equations is shown below.

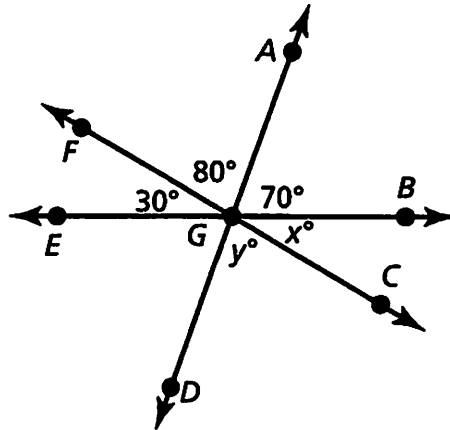
$$-y + 2x = 4$$

$$2x - y = -4$$

Without doing any calculations, what is the solution to the system of equations?

- A** There are infinitely many solutions because the two equations are equal.
- B** There is no solution because  $2x - y$  cannot be 4 and  $-4$ .
- C** The solution is  $(0, 4)$ .
- D** The solution is  $(4, 0)$ .

- 43  $AD$ ,  $BE$ , and  $CF$  intersect at point  $G$ .

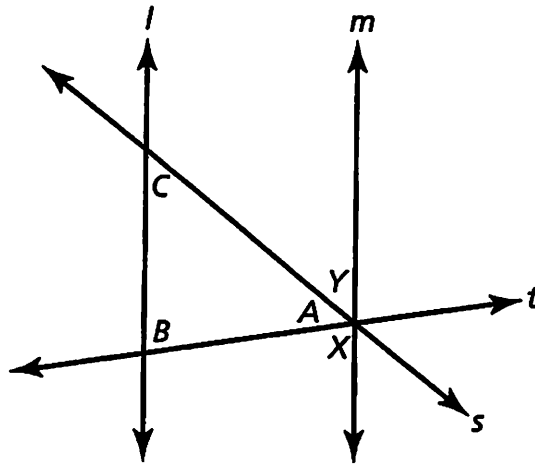


What is the value of  $x$ ?

- A  $30^\circ$
- B  $70^\circ$
- C  $80^\circ$
- D  $110^\circ$

**Go On**

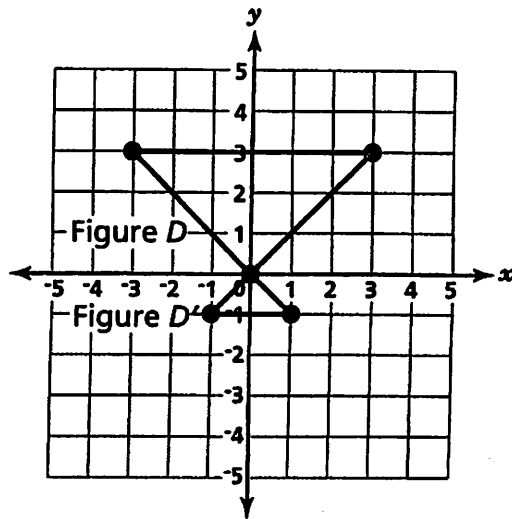
Lines  $l$  and  $m$  are parallel and intersected by transversals  $t$  and  $s$  as shown in the figure below.



If  $\angle C = \angle Y$  and  $\angle B = \angle X$ , which equation is true?

- A  $m\angle A + m\angle B + m\angle C = 180^\circ$
- B  $m\angle A = m\angle B + m\angle C$
- C  $m\angle A - (m\angle B + m\angle C) = 90^\circ$
- D  $m\angle A + m\angle B = m\angle A + m\angle C$

- 45 In the coordinate plane below, Figure  $D'$  is similar to Figure  $D$ .



Which two transformations were performed on Figure  $D$  resulting in Figure  $D'$ ?

- A a reflection over the  $y$ -axis and dilation by a scale factor of  $\frac{1}{2}$  with the origin as the center of dilation
- B a reflection over the  $x$ -axis and dilation by a scale factor of  $\frac{1}{3}$  with the origin as the center of dilation
- C a dilation by a scale factor of  $\frac{1}{2}$  with the origin as the center of dilation and a reflection over the  $y$ -axis
- D a dilation by a scale factor of  $\frac{1}{3}$  with the origin as the center of dilation and a reflection over the  $y$ -axis

**Go On**



**46** The speed of light as it reaches Earth is approximately 300,000,000 meters per second. How is this number written in scientific notation?

- A**  $3 \times 10^5$  meters per second
- B**  $3 \times 10^6$  meters per second
- C**  $3 \times 10^7$  meters per second
- D**  $3 \times 10^8$  meters per second

**47** A cylindrical water tank near the town library is 15 meters high and has a circumference of 85 meters. What is the *approximate* volume, to the nearest whole number, of the water tank?

- A** 1,275 m<sup>3</sup>
- B** 2,875 m<sup>3</sup>
- C** 8,627 m<sup>3</sup>
- D** 34,497 m<sup>3</sup>

**48** Marta surveyed educators about their age and whether they have a doctorate degree. She created the table below to summarize their responses.

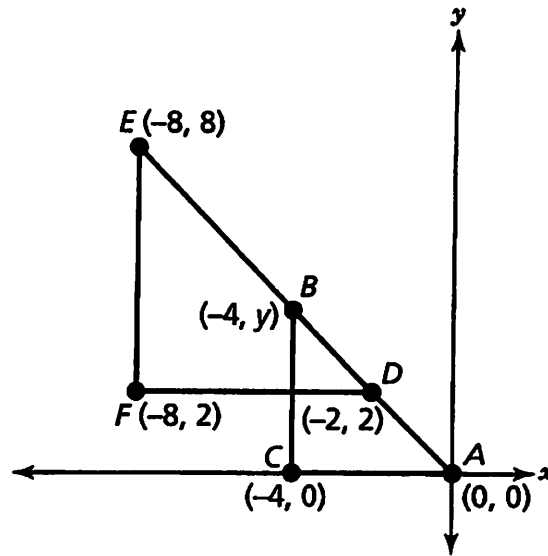
	Have Doctorate	Do Not Have Doctorate
30 or Younger	5	17
Older than 30	12	30

How many educators did Marta survey?

- A** 29
- B** 42
- C** 59
- D** 64

49

In the coordinate plane below,  $\triangle ABC$  is similar to  $\triangle DEF$ .



What is the value of  $y$ ?

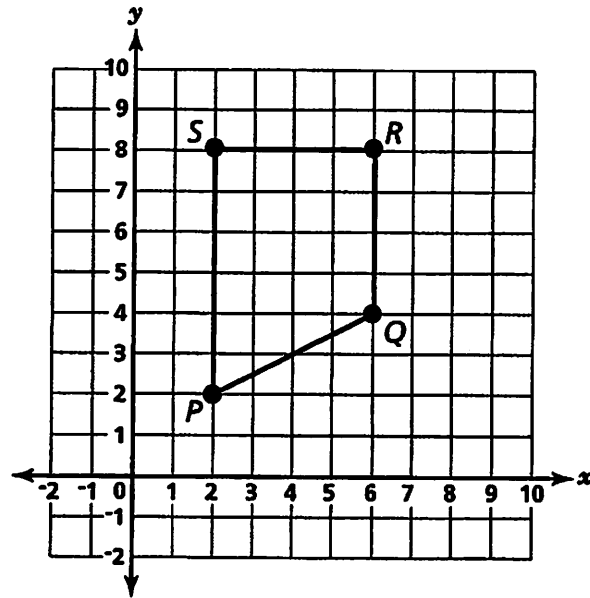
- A 3
- B 4
- C 5
- D 6

50

Where do the lines modeled by the equations  $y = -\frac{7}{8}x$  and  $y = -\frac{7}{8}x + \frac{1}{4}$  intersect?

- A  $(0, 2)$
- B  $(7, 8)$
- C The lines do not intersect.
- D The lines are the same line.

**Go On**

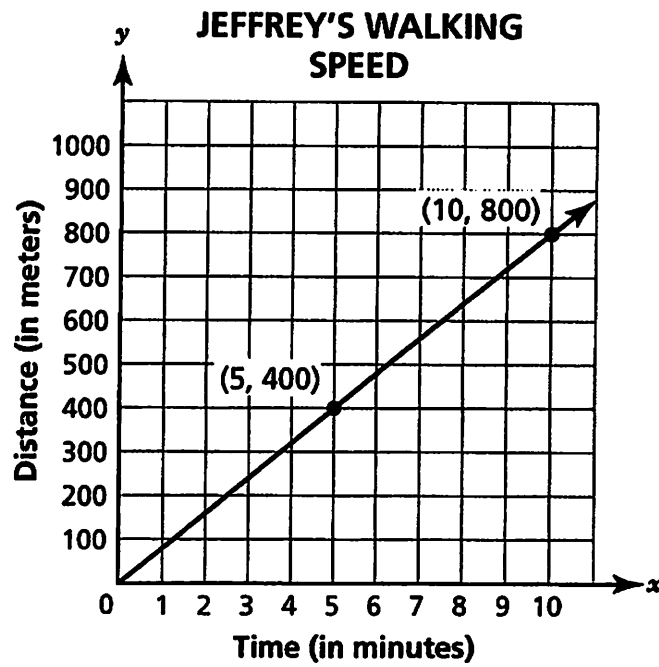
**51**Look at figure  $PQRS$  below.

With a scale factor of 0.5 and the center of dilation at  $(0, 0)$ , what are the coordinates of the points of the image  $P'Q'R'S'$ ?

- A  $P'(1.5, 1.5)$ ,  $Q'(2.5, 1.5)$ ,  $R'(2.5, 3.5)$ ,  $S'(0.5, 3.5)$
- B  $P'(2.5, 2.5)$ ,  $Q'(6.5, 4.5)$ ,  $R'(6.5, 8.5)$ ,  $S'(2.5, 8.5)$
- C  $P'(4, 4)$ ,  $Q'(12, 8)$ ,  $R'(12, 16)$ ,  $S'(4, 16)$
- D  $P'(1, 1)$ ,  $Q'(3, 2)$ ,  $R'(3, 4)$ ,  $S'(1, 4)$

52

Jeffrey and Fumi walk at different speeds. Fumi's walking speed is  $y = 85x$ , where  $x$  is the time in minutes and  $y$  is the distance in meters. Jeffrey's walking speed is shown in the graph below.



Which statement is true?

- A Jeffrey walks 5 meters per minute faster than Fumi.
- B Jeffrey walks 10 meters per minute faster than Fumi.
- C Jeffrey walks 5 meters per minute slower than Fumi.
- D Jeffrey walks 10 meters per minute slower than Fumi.

**Go On**

**53**

What is the equation of the line with a slope of  $-3$  and passes through the point  $(-6, -3)$ ?

- A**  $y = -3$
- B**  $y = -6x - 3$
- C**  $y = -3x - 3$
- D**  $y = -3x - 21$

**54**

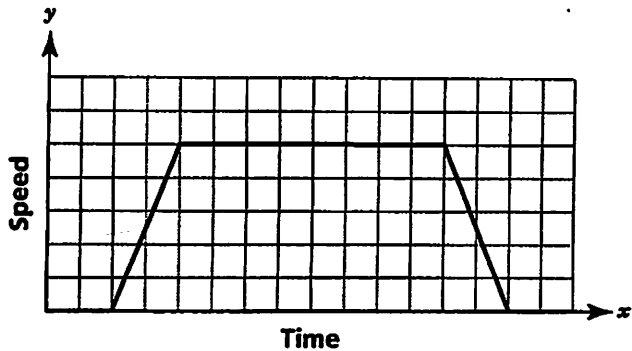
When the points in a scatter plot are clustered around a line of best fit, what does this imply about the correlation between the two variables?

- A** There is a strong correlation.
- B** There is a weak correlation.
- C** There is a negative correlation.
- D** There is a positive correlation.

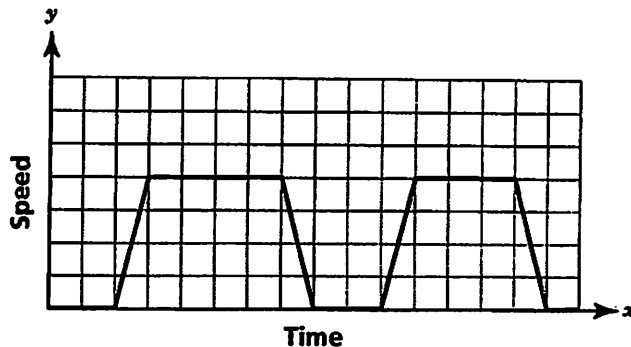
55

Kyle got into his car and steadily accelerated to the speed limit. After driving at a constant rate of speed for a while, he slowed to a stop and parked in a store parking lot. Kyle spent a few minutes shopping, and then reentered his car to drive home. He accelerated to the speed limit, continued at that speed for a while, and then slowed to a stop and parked in his driveway.

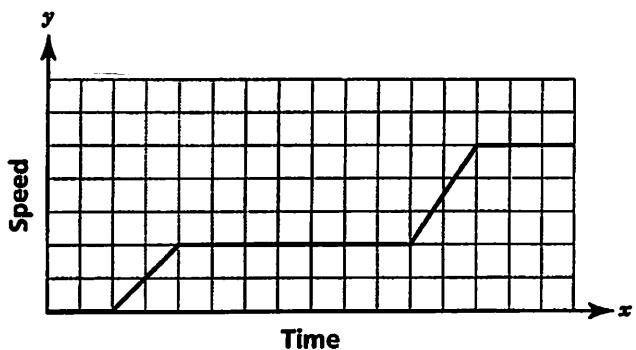
Which graph *best* represents the scenario described?



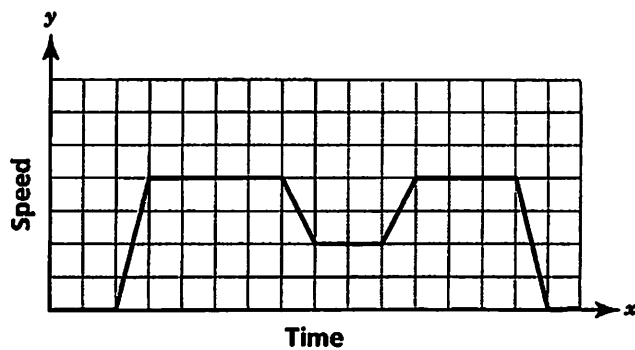
A



C



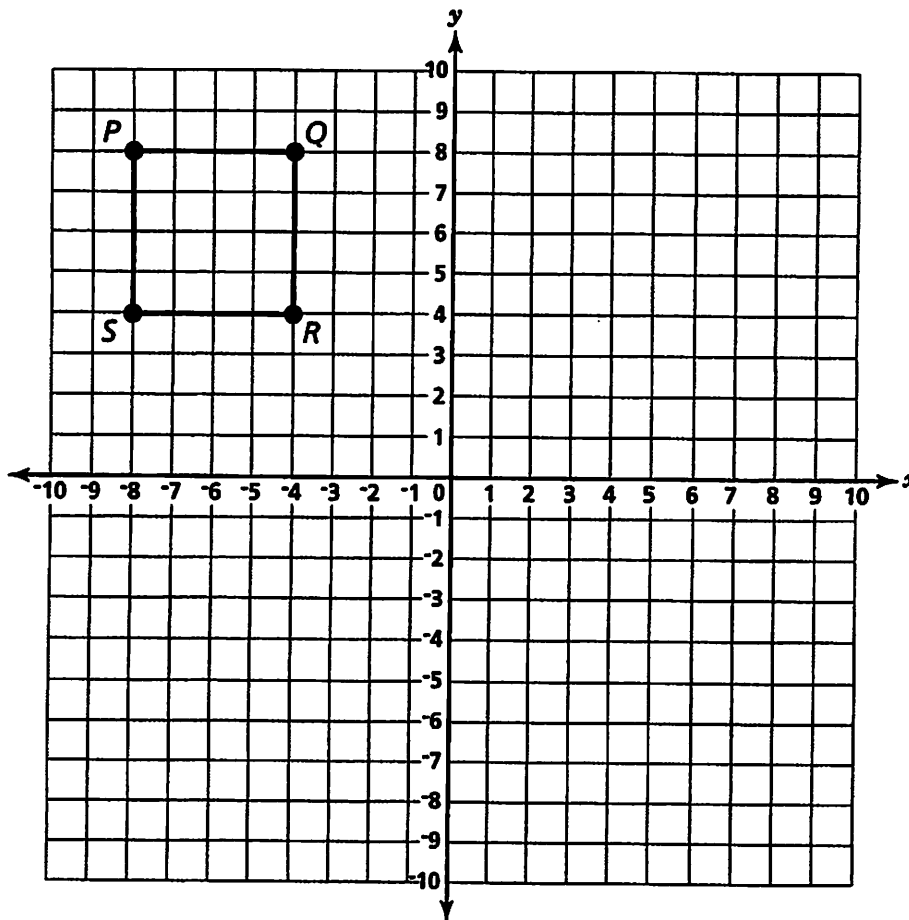
B



D

**Go On**

Quadrilateral  $PQRS$  is shown below.



Which set of coordinates results from a reflection of  $PQRS$  across the  $x$ -axis?

- A  $P'(8, 8), Q'(4, 8), R'(4, 4), S'(8, 2)$
- B  $P'(8, -8), Q'(4, -8), R'(4, -4), S'(8, -2)$
- C  $P'(-8, -2), Q'(-4, -2), R'(-4, -4), S'(-8, -8)$
- D  $P'(-8, -8), Q'(-4, -8), R'(-4, -4), S'(-8, -4)$

**57** In the pair of equations  $bx - 6y = 18$  and  $2x - 3y = 9$ ,  $b$  is a constant. The two equations have infinitely many solutions. What is the value of  $b$ ?

- A 3
- B 4
- C 5
- D 6

**58** The planet Mercury is approximately  $6 \times 10^7$  miles from the sun. The distance between the sun and Mars is approximately  $2 \times 10^8$  miles. *About* how many times farther from the sun is Mars than Mercury?

- A 2
- B 3
- C 20
- D 30

**59** Which equation is a straight line when graphed on a coordinate plane?

- A  $y^2 = 10x + 3$
- B  $y^2 = 10x^2 + 3$
- C  $y = 10x + 3$
- D  $y = 10x^2 + 3$

**Go On**



**60**

Jacob is twice as old as Sue. The sum of their ages is 69 years. How old is Jacob?

- A** 46
- B** 35
- C** 34
- D** 23

**61**

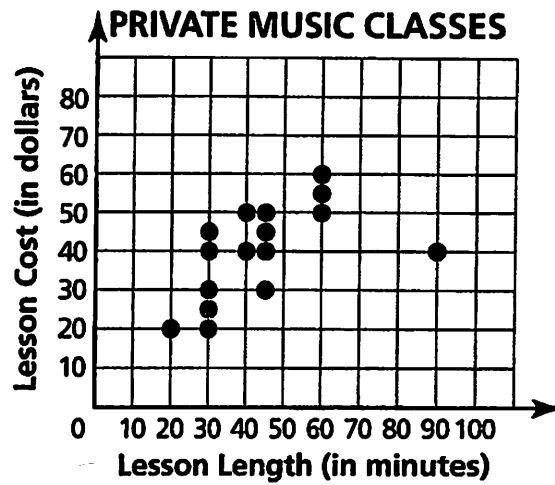
Consider the table below.

$x$	$y$
0	1
1	2
3	8
4	16
5	32
6	64

If the data are graphed on a coordinate plane, would the graph be linear?

- A** Yes, because the rule is  $y = 2x$ .
- B** Yes, because its graph is a straight line.
- C** No, because the graph is only in Quadrant I.
- D** No, because the rate of change is not constant.

62. Which point in the scatter plot below appears to be an outlier?



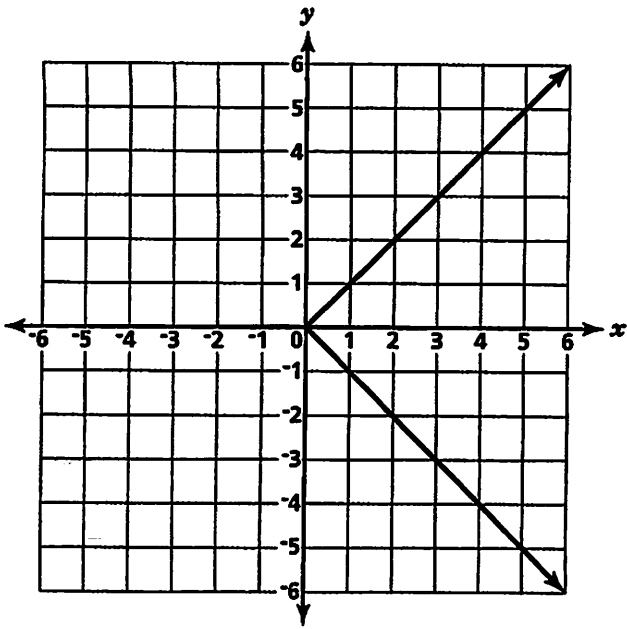
- A the 20-minute lesson that costs \$20  
B the 45-minute lesson that costs \$45  
C the 60-minute lesson that costs \$55  
D the 90-minute lesson that costs \$40

63. Which equation has an infinite number of solutions?

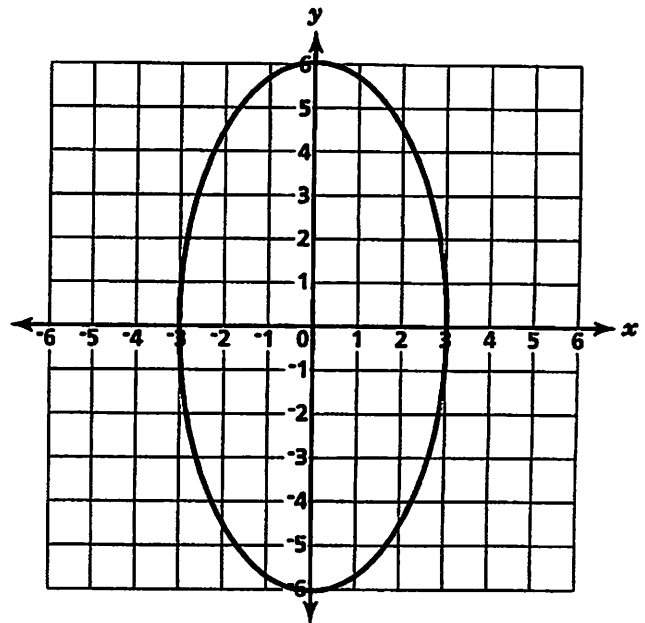
- A  $-8x + 8 = 0$   
B  $\frac{1}{4}(3x - 12) = -\frac{1}{4}x - 3$   
C  $2x + 8 = 2(x + 8)$   
D  $\frac{1}{2}(6x - 10) = 3x - 5$

**Go On**

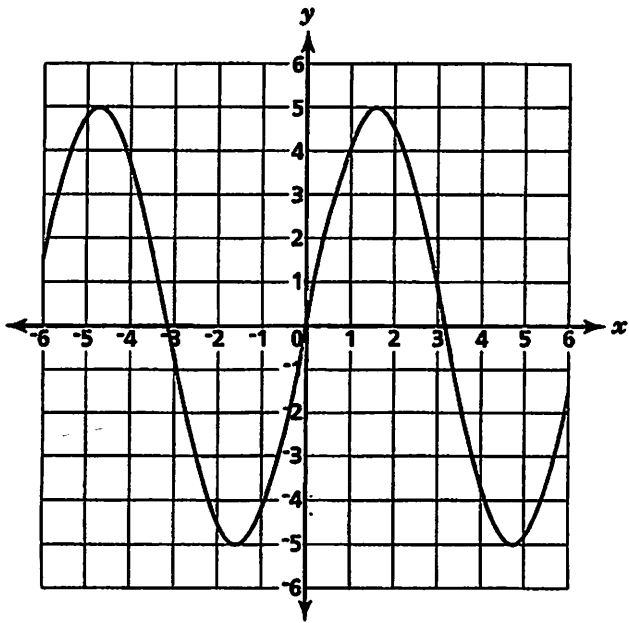
**64** Which graph represents a function?



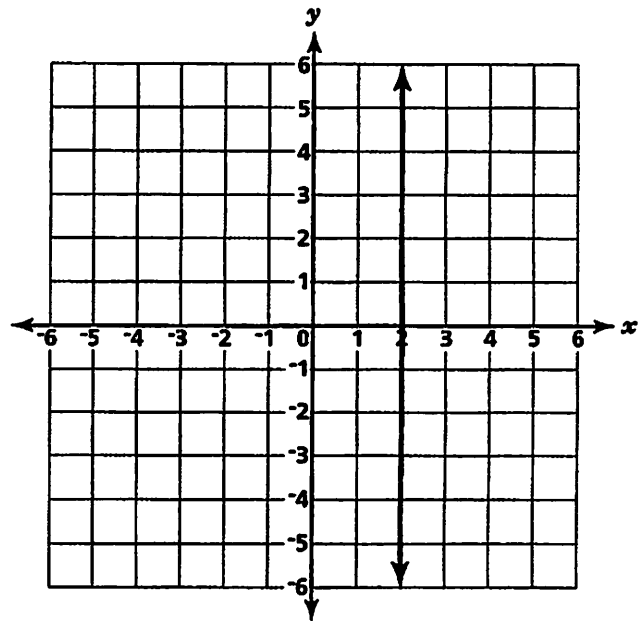
**A**



**C**



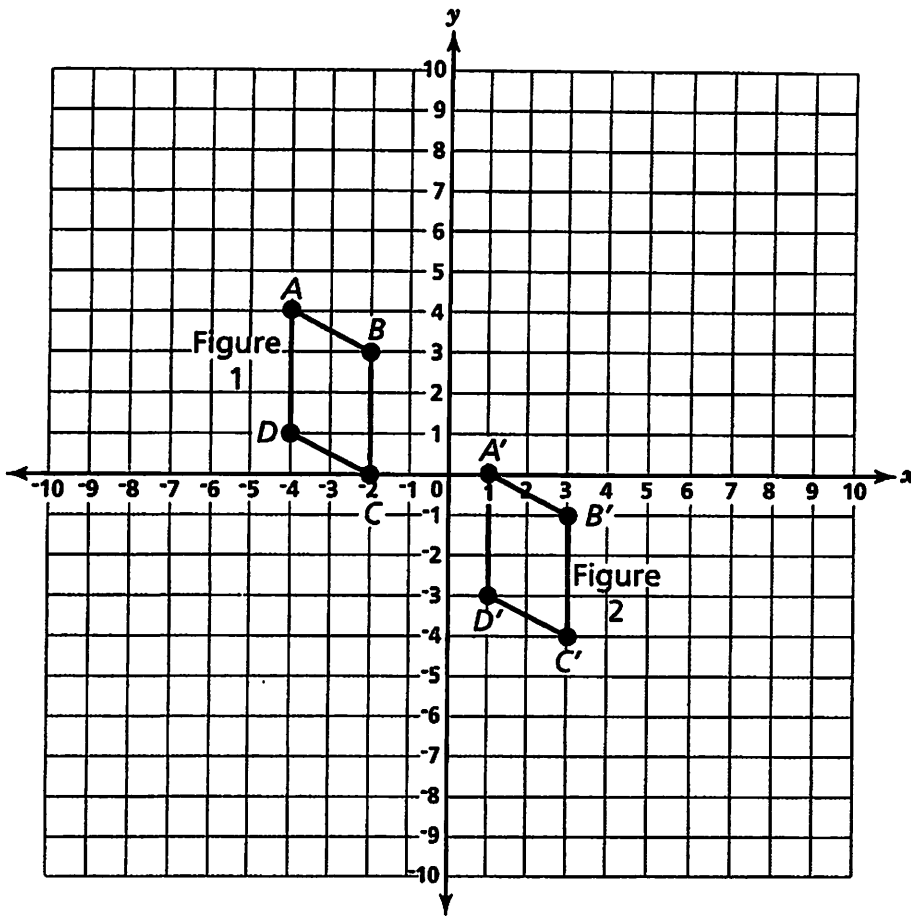
**B**



**D**

65

Which sequence of transformations is performed so that Figure 1 is congruent to Figure 2?



- A Figure 1 is translated 3 units down and 4 units to the right.
- B Figure 1 is translated 5 units down and 4 units to the right.
- C Figure 1 is translated 4 units down and 5 units to the right.
- D Figure 1 is translated 4 units up and 5 units to the left.

**Go On**

66 Which expression is *not* equivalent to  $\frac{1}{343}$ ?

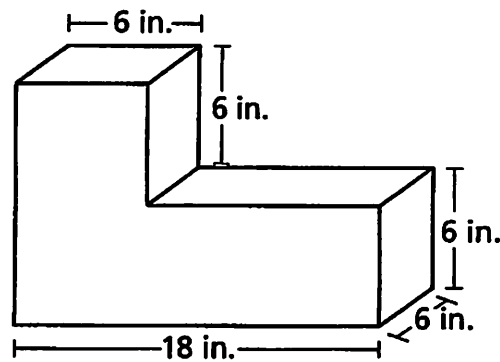
A  $7^4 \times 7^{-7}$

B  $7^7 \times 7^{-10}$

C  $7^{-2} \times 7^{-5}$

D  $7^{-5} \times 7^2$

67 The figure below is made of a cube and a rectangular prism.



[not drawn to scale]

What is the surface area of the figure?

A  $864 \text{ in.}^2$

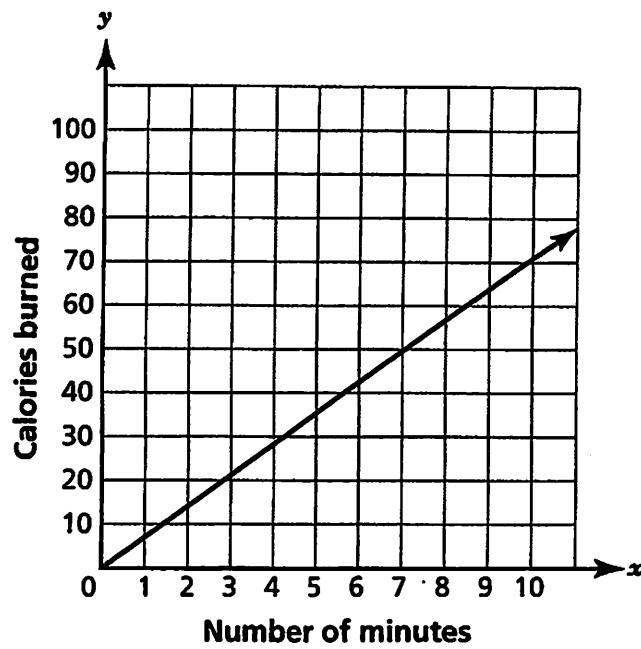
B  $792 \text{ in.}^2$

C  $648 \text{ in.}^2$

D  $612 \text{ in.}^2$

68

The graph shows the number of calories a person burns while doing moderate exercise.



How many calories does a person burn per minute?

- A 14
- B 7
- C 4
- D 3

**STOP**

Answer questions 69 through 78. You may use a calculator.

**69** The mass of Earth is  $5.97 \times 10^{24}$  kilograms. The mass of the Moon is  $7.34 \times 10^{22}$  kilograms.

**Part A**

What is the combined mass of Earth and the Moon? Express your answer in scientific notation.

**Show your work.**

**Answer** \_\_\_\_\_ kilograms

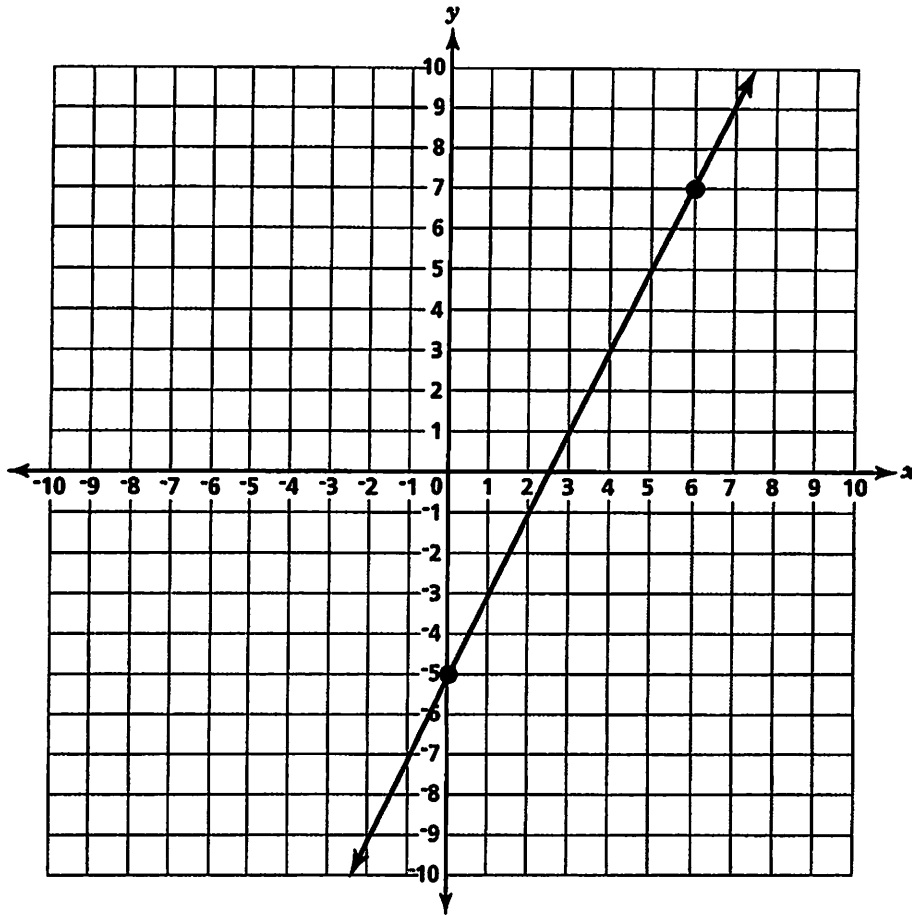
**Part B**

How many times greater is the mass of Earth than the mass of the Moon? Express your answer in scientific notation.

**Show your work.**

**Answer** \_\_\_\_\_

**70** The graph below shows the solutions to  $y = 2x - 5$ .



**Part A**

The line  $y = -\frac{1}{2}x$  is perpendicular to  $y = 2x - 5$ . Graph the solutions to  $y = -\frac{1}{2}x$  on the same coordinate plane.

**Part B**

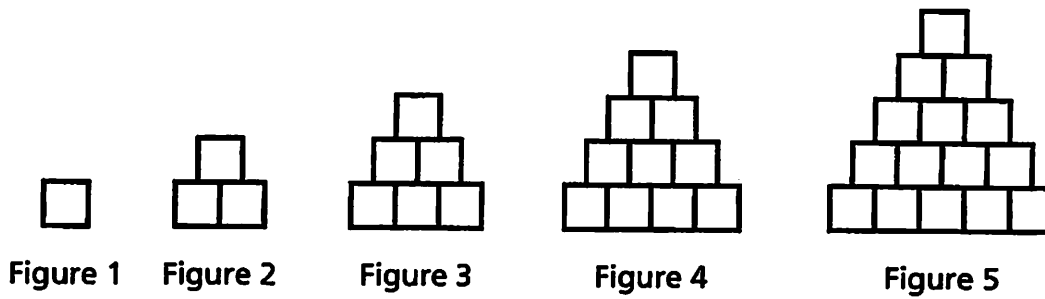
Using the graph you drew in Part A, what point is the solution to both  $y = -\frac{1}{2}x$  and  $y = 2x - 5$ ?

**Answer** \_\_\_\_\_

**Go On**



Jeremiah uses blocks to form the first five figures of a pattern as shown below.



**Part A**

Make a table of ordered pairs showing each figure number and the number of blocks in the figure.

**Part B**

Graph the relationship between the figure number and the number of blocks in the figure.

**Part C**

Is the relationship between the figure number and the number of blocks in the figure a linear function? Explain your answer.

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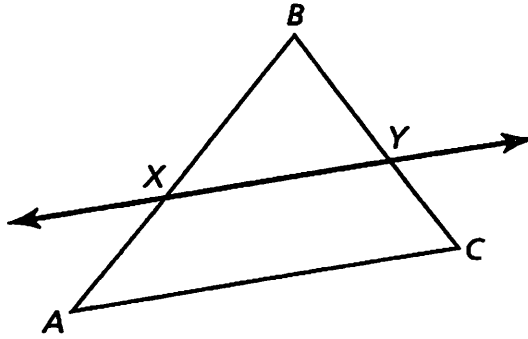


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**72** Line  $XY$  is parallel to line segment  $AC$  as shown in the figure below.



**Part A**

Name two similar triangles shown in the figure.

**Answer** \_\_\_\_\_

**Part B**

Explain why the triangles are similar.

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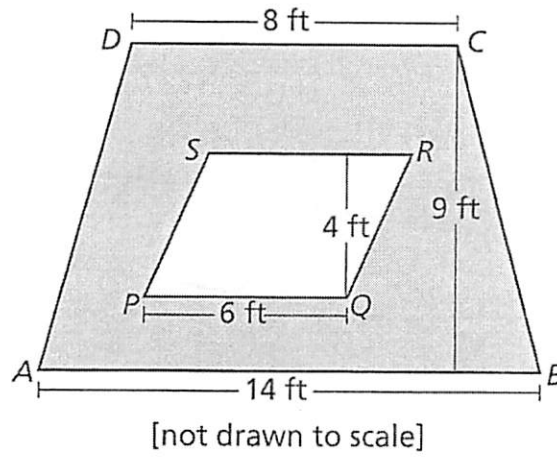
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**Go On**

73 Look at the figure below.



**Part A**

What is the area of trapezoid  $ABCD$ ?

**Show your work.**

**Answer** \_\_\_\_\_ square feet

**Part B**

What is the area of parallelogram  $PQRS$ ?

**Show your work.**

**Answer** \_\_\_\_\_ square feet

**Part C**

What is the area of the shaded region?

**Show your work.**

**Answer** \_\_\_\_\_ square feet

**Go On**

**74**

Consider the equation below.

$$\frac{1}{5}(x + 2) + 2x = 6x - 30$$

**Part A**

Which property can be used to simplify the expression  $\frac{1}{5}(x + 2)$ ?

**Answer** \_\_\_\_\_

**Part B**

Move all x-terms to one side of the equation and simplify.

**Show your work.**

**Answer** \_\_\_\_\_

**Part C**

What is the value of x?

**Show your work.**

**Answer** \_\_\_\_\_

**75**

The table below shows the daily temperature and sales of lemonade at Cool Lemonade Shop for the past 10 days.

Temperature (°F)	Sales (\$)
64.4	119
68.2	130
62.8	115
71	140
67.8	128
72.6	142
78.8	165
75	154
63.4	118
59.8	112

**Part A**

Sketch a scatter plot to show the relationship between the daily temperature and sales of lemonade shown in the table above. *(use graph paper)*

**Part B**

What type of association does the scatter plot show, linear or nonlinear? Explain your answer.

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**Go On**

**76**

Consider the pair of linear equations below.

$$4x + 6y = 12$$

$$2x + 3y = 6$$

**Part A**

What is the relationship, if any, between 12 and 6?

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**Part B**

Do the two equations have one solution, no solution, or infinitely many solutions? Explain.

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**Part C**

How can you verify your answers to Parts A and B by solving algebraically?

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**77**

A computer technician keeps track of his earnings throughout each month. The technician observes that his earnings are a linear function of the number of hours he works during the month. The technician finds that when he works 55 hours during the month, he earns \$2,125, and when he works 30 hours, he earns \$585.

**Part A**

Write a linear function to model the relationship between the number of hours worked and the money earned.

**Function** \_\_\_\_\_

**Part B**

Explain the meaning of slope in the context of the problem.

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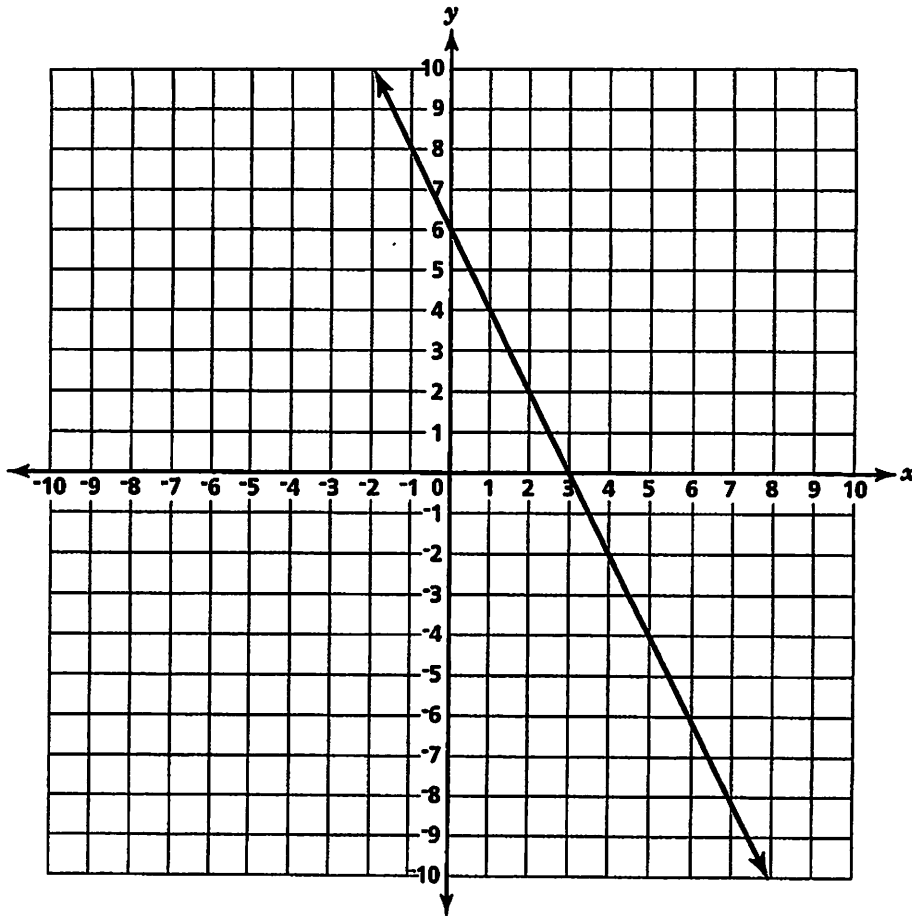
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**Go On**



78 Consider the graph below.



**Part A**

Find the  $y$ -intercept,  $b$ , and the slope,  $m$ , of the line.

*Show your work.*

**Answer** \_\_\_\_\_

**Part B**

Write the equation of the line.

**Equation** \_\_\_\_\_

**STOP**